

**REMARKS**

**Summary of the Office Action**

Claims 1 and 3 stand objected to because of informalities.

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hisahiro Ishihara (JP 61,171,176) (hereinafter "Ishihara '176") and Hisahiro Ishihara (JP 60,163,471) (hereinafter "Ishihara '471").

Claims 1 and 2 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 3, respectively, of copending Application No. 10/864,797.

**Summary of the Response to the Office Action**

Applicant has canceled claims 3 and 6 without prejudice or disclaimer. Applicant has also amended claims 1 and 4 to differently describe embodiments of the disclosure of the instant application's specification. Accordingly, claims 1, 2, 4, and 5 are currently pending for consideration.

**Objections to Claims 1 and 3**

Claims 1 and 3 stand objected to because of informalities. Claim 3 has been canceled without prejudice or disclaimer, rendering this objection moot. Claim 1 has been amended in accordance with the Examiner's helpful suggestion at page 2, section 1 of the Office Action. Withdrawal of the objections to claims 1 and 3 is respectfully requested.

**Double Patenting Rejection**

Claims 1 and 2 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 3, respectively, of copending Application No. 10/864,797. Applicant respectfully submits that claim 1 has been amended to differently describe embodiments of the disclosure of the instant application's specification, and to render the claims particularly different from the combinations described in claims 1 and 3 of copending application no. 10/864,797. Applicant respectfully submits that claim 1 (as well as claim 4) of the instant application have been newly-amended to describe, for example, an "inverted mesa" recess structure, as shown in Fig. 3A of the instant application. Accordingly, the double patenting rejection has been rendered moot. Withdrawal of the double patenting rejections is respectfully requested.

**Rejection under 35 U.S.C. § 103(a)**

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishihara '176 and Ishihara '471. Applicant has canceled claims 3 and 6 without prejudice or disclaimer, rendering the rejections of these claims moot. Also, Applicant has amended claims 1 and 4 to differently describe embodiments of the disclosure of the instant application's specification. To the extent that these rejections might be deemed to apply to the claims as newly-amended, they are respectfully traversed for at least the following reasons.

Applicant respectfully submits that independent claims 1 and 4 of the instant application have been newly-amended to describe, for example, an "inverted mesa" recess structure, as shown in Fig. 3A of the instant application.

Independent claim 1 has been amended to describe a semiconductor photodetector having a combination of features including: (A) a semi-insulating substrate having three surfaces (upper, middle and lower step surfaces) as well as an inverted mesa recess structure; (B) first and second semiconductor layers forming p-n junction on/above the lower step surface and forming flat surfaces with neighboring step surfaces; (C) a first electrode formed astride/over on/above both of the surfaces of the first semiconductor layer and the middle step surface; and (D) a second electrode formed astride/over on/above both of the surface of the second semiconductor layer and the upper step surface.

According to the advantageous combination of features describe in newly-amended independent claim 1 of the instant application: (1) breaking of 1<sup>st</sup> and 2<sup>nd</sup> electrodes is prevented because these electrodes are formed on flat surfaces, and (2) the boundary between the 2<sup>nd</sup> semiconductor layer and upper step surface became more flat, because the recess has an inverted mesa structure (side wall and bottom forms an acute angle). Applicant notes that when using an inverted mesa structure, the extension of the 2<sup>nd</sup> semiconductor layer over the boundary is prevented in the manufacturing step. As a result, Applicant respectfully submits that the yield and reproducibility of the semiconductor photodetector is improved.

Similar features are described in newly-amended independent claim 4. Accordingly, similar arguments as set forth above with regard to newly-amended independent claim 1 also apply to newly-amended independent claim 4.

Applicant respectfully submits that Ishihara '176 does not show or even suggest a middle step surface. The electrode (7) in Fig. 1(f) of Ishihara '176 is formed on an uneven surface.

While Ishihara '176 shows a mesa recess structure in Fig. 1(f), it does not show, or even suggest, an inverted mesa recess structure.

The Examiner states that Ishihara '471 shows a “middle” step surface in the Office Action on page 4, line 5. However, Applicant respectfully submits that there is not a lower step surface in Fig. 2 or Ishihara '471, because this surface is called “middle.” In other words, Applicant respectfully submits that each of Ishihara '176 and Ishihara '471 shows only two different height surfaces, neither of these references shows, or even suggests, the provision of three different height surfaces. Applicant respectfully submits that the electrode (7) in Ishihara '471 is formed only on the p-type semiconductor region (5). Numerical reference (6) in Ishihara '471 indicates an insulator film.

Applicant respectfully submits that even assuming, strictly arguendo, that Ishihara '176 and Ishihara '471 were combined as asserted by the Office Action, a semiconductor photodetector having three step surfaces, as specifically described in the claims, could not be derived from this combination.

In addition, Applicant respectfully submits that the concept of applying an inverted mesa recess structure to the above-described structure is not disclosed, or even suggested, in any of the cited references Ishihara '176 and Ishihara '471.

Applicant respectfully submits that the effects of the present invention are not disclosed or suggested in any of the cited references Ishihara '176 and Ishihara '471. Therefore, the inventions defined in independent claim 1 and 4 cannot be easily derived from Ishihara '176 and Ishihara '471.

Accordingly, Applicant respectfully assert that the rejections under 35 U.S.C. § 103(a) should be withdrawn because neither Ishihara '176 nor Ishihara '471, whether taken singly or combined, teach or suggest each feature of independent claim 1 or 4, as amended. MPEP § 2143.03 instructs that “[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 409 F.2d 981, 180 USPQ 580 (CCPA 1974).” Furthermore, Applicant respectfully asserts that dependent claims 2 and 5 are allowable at least because of their dependence from claim 1 or 4, and the reasons set forth above.

### **CONCLUSION**

In view of the foregoing, Applicant submits that the pending claims are in condition for allowance, and respectfully request reconsideration and timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicant’s undersigned representative to expedite prosecution. A favorable action is awaited.

**EXCEPT** for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. § 1.16 and 1.17 which may be required, including

any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0573.

This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

**DRINKER BIDDLE & REATH LLP**

Dated: January 16, 2007

By:



Paul A. Fournier

Reg. No. 41,023

**Customer No. 055694**

**DRINKER BIDDLE & REATH LLP**

1500 K Street, N.W., Suite 1100

Washington, DC 20005-1209

Tel.: (202) 842-8800

Fax: (202) 842-8465